Ex. 1 Part A:

Advertising Investment (1000 ILS) (x^i)	**Sales Growth (1000 ILS) (y^i)**	$x^i \times y^i$	${x_i}^2$
10	25	250	100
15	30	450	225
20	40	800	400
25	45	1125	625
30	50	1500	900
35	60	2100	1225
40	65	2600	1600
45	70	3150	2025
50	80	4000	2500
Sum = 270	**Sum = 465**	**Sum = 15975**	**Sum = 9600**

$\sum x_i$ = 270

$\sum y_i$ = 465

$\sum x_i y_i$ = 15975

$\sum {x^2}_i$ = 9600

$$m = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{n\sum x_i^2 - (\sum x_i)^2}$$

$$m = \frac{9\times 15975 - 270\times 465}{9\times 9600 - 270^2} = \frac{143775 - 125550}{86400 - 72900} = \frac{18225}{13500} = 1.35$$

$$b = \frac{\sum y_i - m\sum x_i}{n}$$

$$b = \frac{465 - 1.35\times 270}{9} = \frac{465 - 364.5}{9} = \frac{100.5}{9} = 11.16$$

$$y = 1.35x + 11.16$$

Ex. 1 Part C:

Advertising Investment (1000 ILS) x	**Sales Growth (1000 ILS) y**	$(x_i - \bar{x})$	$(y_i - \bar{y})$	$(x_i - \bar{x}) \times (y_i - \bar{y})$	$(x_i - \bar{x})^2$
10	25	-20	-26.66	533.2	400
15	30	-15	-21.66	324.9	225
20	40	-10	-11.66	116.6	100
25	45	-5	-6.66	33.3	25
30	50	0	-1.66	0	0
35	60	5	8.34	41.7	25
40	65	10	13.34	133.4	100
45	70	15	18.34	275.1	225
50	80	20	28.34	566.8	400
$\bar{x}$ = 30	**$\bar{y}$ = 51.66**			**Sum = 2025**	**Sum = 1500**

$\bar{x} = \sum x_i / n = \frac{270}{9} = 30$

$\bar{y} = \sum y_i / n = \frac{465}{9} = 51.66$

$b_1 = \frac{\sum((x_i - \bar{x}) \times (y_i - \bar{y}))}{\sum(x_i - \bar{x})^2} = \frac{2025}{1500} = 1.35$

$b_0 = \bar{y} - b_1 \times \bar{x} = 51.66 - 1.35 \times 30 = 11.16$

$\hat{y} = b_0 + b_1 x = 1.16 + 1.35x$

Ex. 2 Part A:

Call houres (x^i)	Profit (10k \$) (y^i)	$x^i \times y^i$	x_i^2
2	50	100	4
3	70	210	9
4	90	360	16
5	100	500	25
6	110	660	36
Sum = 20	**Sum = 420**	**Sum = 1830**	**Sum = 90**

$\sum x_i$ = 20

$\sum y_i$ = 420

$\sum x_i y_i$ = 1830

$\sum x^2{}_i$ = 90

$$m = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{n\sum x_i^2 - (\sum x_i)^2}$$

$$m = \frac{5\times1830-20\times420}{5\times90-20^2} = \frac{9150-8400}{450-400} = \frac{750}{50} = 15$$

$$b = \frac{\sum y_i - m\sum x_i}{n}$$

$$b = \frac{420 - 15\times 20}{5} = \frac{420-300}{5} = \frac{120}{5} = 24$$

$$y = 15x + 24$$

Ex. 2 Part B:

מצא כמה רווח יהיה אחרי 8 שעות:

$$y = 15\times 8 + 24 = 120 + 24 = 144$$

הרווח לאחר 8 שעות שיחות יהיה 144K \$

Ex. 2 Part C:

כמה שעות יובילו לרווח של $ 150K

$150 = 15x + 24$

$150 - 24 = 15x$

$126 = 15x$

$x = 8.4$

8.4 שעות יובילו לרווח של $ 150K